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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,782	06/27/2003	Sabina J. Houle	884.860US1	6464

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SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402

EXAMINER

WARREN, MATTHEW E

ART UNIT PAPER NUMBER

2815

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/607,782

Applicant(s)

HOULE, SABINA J.

Examiner

Matthew E Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 19-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 27-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to the Election filed on October 25, 2004.

#### ***Election/Restrictions***

Applicant's election without traverse of Group I, claims 1-18, 27-29 in the reply filed on October 25, 2004 is acknowledged.

Claims 19-26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 3, and 13-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims contain the limitation "optionally..." The term "optionally" renders the claims indefinite because such a limitation does not positively recite the structure of the invention. In essence, the first or second plug may or may not be disposed in the channel.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8-10, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Altoz (US 4,915,167).

In re claims 1, 8, and 10, Altoz shows (fig. 2) a package comprising: a heat spreader (22) including a die side (25) and a heat sink side (opposite upper side 25), and a container barrier (28) disposed on the heat spreader die side, wherein the container barrier and the heat spreader form a recess (29) upon the die side. A liquid transfer medium (26) is disposed in the recess.

In re claim 9, Altoz discloses (col. 3, lines 57-67) that the liquid heat transfer medium is a metal.

In re claim 17, Altoz shows (fig. 2) that a die is (20) in contact with the liquid heat transfer medium.

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Claims 1, 2, 6-13, 17, and 18 are rejected under 35 U.S.C. 102(a) as being anticipated by Shermer, IV et al. (US 6,429,513 B1).

In re claims 1, 8, and 10, Shermer, IV et al. shows (fig. 1) a package comprising: a heat spreader (12) including a die side (74) and a heat sink side (opposite upper side 72), and a container barrier (sidewalls of heat spreader) disposed on the heat spreader die side, wherein the container barrier and the heat spreader form a recess upon the die side. A liquid transfer medium (46) is disposed in the recess.

In re claims 2 and 13, Shermer, IV shows (fig. 1) a first channel (104) through the heat spreader to communicate from the die side to the heat sink side and a first plug disposed in the first channel.

In re claims 6 and 7, Shermer, IV shows (fig. 4) that the container barrier is selected from solder (54) and metal (136).

In re claim 9, Shermer, IV discloses (col. 3, lines 53-60) that the liquid heat transfer medium is an organic composition.

In re claims 11 and 12, Shermer, IV shows (fig. 1) that the heat spreader is selected from one of a heat slug, a heat pipe, and an integrated heat spreader, and that the die side of the heat spreader includes a convoluted interface (radiating fins within the cavity) with the liquid heat-transfer medium.

In re claims 17 and 18, Shermer shows (fig. 4) that the die (16) is in contact with the liquid heat transfer medium (46) and a mounting substrate (18) is coupled to the die.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shermer, IV et al. (US 6,429,513 B1) as applied to claims 1 and 10 above, and further in view of Tao (US 6,410,981 B2).

In re claims 3 and 14-16, Shermer, IV shows all of the elements of the claims except the second channel formed through the heat spreader and the channels formed through the container barrier. Shermer already shows 1 channel and plug formed in the heat spreader, however, it would have been obvious to one of ordinary skill in the art to use three, four, etc., channels and plugs since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). See also MPEP 2144.04 VI. (B). With respect to the limitations of the channels formed in the container barrier, Tao shows (figs. 1 and 3) that a package, including a heat dissipater (heat sink) comprises a container barrier (2) disposed on the heat spreader die side. The container barrier further comprises channels (12 and 11) formed through it to form a reliable package that removes high pressure moisture and gas from the interior of the package (col. 2, lines 49-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the barrier container in the package of Shermer

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by forming channels in the barrier container as taught by Tao to form a reliable package that removes unwanted high pressure moisture and gas from the interior of the package.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shermer, IV et al. (US 6,429,513 B1) as applied to claims 1 and 10 above, and further in view of Tao (US 6,410,981 B2) and Studebaker (US 6,448,637 B1).

In re claims 4 and 5, Shermer, IV shows all of the elements of the claims except the second channel formed through the heat spreader, the channels formed through the container barrier, and the plugs being gas and liquid permeable. Shermer already shows 1 channel and plug formed in the heat spreader, however, it would have been obvious to one of ordinary skill in the art to use three, four, etc., channels and plugs since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). See also MPEP 2144.04 VI. (B). With respect to the limitations of the channels formed in the container barrier, Tao shows (figs. 1 and 3) that a package, including a heat dissipater (heat sink) comprises a container barrier (2) disposed on the heat spreader die side. The container barrier further comprises channels (12 and 11) formed through it to form a reliable package that removes high pressure moisture and gas from the interior of the package (col. 2, lines 49-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the barrier container in the package of Shermer by forming channels in the barrier container as

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taught by Tao to form a reliable package that removes unwanted high pressure moisture and gas from the interior of the package.

In re the limitations concerning the plugs being gas and liquid permeable, Studebaker shows (figs. 1 and 2) a hermetic package having a plug (30) formed in a channel to seal the package and prevent outside materials from entering the package but also allowing gas and moisture to be released if the internal pressure builds up. Such a configuration reduces mechanical stresses on the package (col. 2, lines 39-53). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the plugs in the package of Shermer and Tao by using gas and liquid permeable plugs as taught by Studebaker to reduce mechanical stress on the package while maintaining its protection from the outside environment.

Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiacomo et al. (US 6,085,831) in view of Homer et al. (US Pub. 2002/0154483 A1).

In re claim 27, DiGiacomo et al. shows (fig. 1) a computing system comprising: a heat spreader (53) including a die side and a heat sink side (top), a container barrier (sidewalls of heat spreader) disposed on the heat spreader die side wherein the container barrier and the heat spreader form a recess upon the die side, a die (21) in contact with portions of the container barrier (55), a liquid heat transfer medium (50) disposed in the recess, and at least one of an input and an output device (23) coupled to the die. DiGiacomo et al. shows all of the elements of the claims except the dynamic random access data storage coupled to the die. It is well known in the art that a DRAM



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can be coupled to a die liquid cooled die however, Homer et al. discloses that a cooled processor [0024] may be coupled to a DRAM [0018] to store and facilitate the execution of programs. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the package of DiGiacomo et al. by coupling a DRAM to the die of the package as taught by Homer to store and facilitate the execution of programs.

In re claims 28 and 29, Homer discloses [0016] that the computing system is disposed in a computer and that the die is selected from a processor.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fitch (US 5,386,143) and Yamaguchi (JP 63-96945 A) also discloses packages having a liquid heat transfer medium.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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November 19, 2004

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800